

Application No.: 10/620,061

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REMARKS**I. Status of Claims**

Upon entry of this amendment, claims 21-33 are pending in the application. Claims 1-20 have been canceled herein. Claims 21 and 22 have been amended. Claims 23 to 33 are newly added.

In order to expedite prosecution of the application and advance the case toward allowance, claim 21 has been amended to recite a method for lowering the salt content of soil by cultivating a transgenic plant comprising a recombinant nucleic acid encoding a vacuolar Na^+/H^+ transporter. Support for this amendment is found throughout the specification as filed, in particular, at originally filed claim 13. Claim 22 has been amended to correct a typographical error. New dependent claims 23 to 33 find support throughout the specification, particularly in the original dependent claims. Thus, no new matter is added by this amendment and entry of the amendment is respectfully requested.

II. Priority**A. Statement of Priority**

Applicants thank the Examiner for pointing out the typographical error in the statement of priority. Applicants have amended the statement to reflect the correct application number, which should address the Examiner's concerns.

B. Effective Filing Date

The Office Action argues that the parent applications to which this application cites priority do not provide support for claims to any non-naturally occurring non-halophyte plant comprising a tissue with an elevated level of sodium substantially in the vacuole when cultivated in high salt.

Applicants respectfully traverse this assertion and its supporting remarks. However, in the interests of expediting prosecution, Applicants have submitted an amended set of claims.

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Amended claim 21 and all new dependent claims therefrom recite a method for lowering the salt content of soil by cultivating a transgenic plant comprising a recombinant nucleic acid encoding a vacuolar Na^+/H^+ transporter. As noted above, support for these amended and new claims is found throughout the specification as filed. Furthermore, support for these claims is also found in the specifications of the two applications to which this application claim priority. For example, in U.S. Ser. App. No. 09/271, 584 (now US 7,041,875), filed March 18, 1999, see the section entitled "Bioremediation" at Col. 29, lines 61, to Col. 30, line 7 (citation is to the issued patent) and in U.S. Ser. App. No. 10/155,535 (now US 6,936,750), filed May 24, 2003, see Col. 24, lines 10 to 24 (citation to issued patent). Thus, Applicants respectfully assert that the priority date for the presently pending claims is March 18, 1999.

III. Claim Objections

The Office Action objects to claims 2-19 and 21-22 for certain informalities. Claims 2-19 have been canceled so the objection is moot with respect to these claims. As suggested, Applicants have amended claim 21 to recite "said method" and inserted a comma in claim 22. Applicants therefore respectfully request withdrawal of the objections.

IV. Rejection under 35 U.S.C. §112, first paragraph, written description

The Office Action rejects claims 1-22 for lack of written description. Specifically, the Office Action alleges that there is insufficient description of any non-naturally occurring non-halophyte plant that accumulates sodium in its vacuoles, as this encompasses mutant plants, plants transformed with nucleic acids encoding proteins other than Na^+/H^+ transporter, as well as plant transformed with nucleic acids encoding Na^+/H^+ transporters.

Applicants respectfully traverse this rejection and its supporting remarks. However, in the interests of expediting prosecution, Applicants have amended the claims to recite a method for lowering the salt content of soil by cultivating a transgenic plant comprising a recombinant nucleic acid encoding a vacuolar Na^+/H^+ transporter. As such, the rejection is now moot and thus Applicants respectfully request withdrawal of the rejection.

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V. Rejection under 35 U.S.C. §112, first paragraph, enablement

The Office Action rejects claims 1-22 for lack of enablement. The Office Action argues that while the specification is enabling for plants transformed with a nucleic acid encoding SEQ ID NO: 1, it is not enabling for any non-naturally occurring non-halophyte plant that accumulates sodium in its vacuoles. Specifically, the Office Action alleges that the specification fails to provide guidance for the plants transformed with nucleic acids encoding a Na^+/H^+ transporter other than SEQ ID NO: 1, mutant plants, and plants transformed with nucleic acid encoding a proteins other than a Na^+/H^+ transporter.

To the extent the rejection applies to the amended claims, Applicants respectfully traverse the rejection and its supporting remarks. Enablement requires only that the specification teach *one of skill in the art* how to make and use the invention. Furthermore, as stated in MPEP § 2164.01, a patent preferably omits what is known in the art. As amended, the claims recite a method for lowering the salt content of soil by cultivating a transgenic plant comprising a recombinant nucleic acid encoding a vacuolar Na^+/H^+ transporter in the soil and harvesting the plant. Methods for growing transgenic plants in soil and harvesting plants are well known in the art. The specification as filed fully describes how to make and use transgenic plants having a recombinant nucleic acid encoding a vacuolar Na^+/H^+ transporter. General guidance regarding methods for making transgenic plants to be used in methods of the invention are provided in the section entitled "Methods of Making the Plants," starting at paragraph 47 in the published version of the application (2006/0195948). For example, see paragraphs 48 to 64, which describe various methods for identifying vacuolar Na^+/H^+ transporters other than SEQ ID NO: 2 (including hybridization conditions) and Table III, which provides a list of 19 other examples of vacuolar Na^+/H^+ transporters. Also see paragraphs 65 to 76, which describe expression constructs, and paragraphs 77 to 85, which describe methods for transforming such constructs to produce transgenic plants. Thus, the based on the guidance on the specification and knowledge which is generally known in the art, one of skill would know to how make and use the invention.

The remarks in the Office Action suggest that the Examiner has rejected the claims for lack of enablement because she believes one of skill would have to perform a considerable amount

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of experimentation in order to develop and evaluate nucleic acids which hybridize to SEQ ID NO:1 and encode Na^+/H^+ transporters. However, even if a considerable amount of experimentation were required (which is denied), Applicants would like to remind the Examiner that it is the nature, not the amount, of experimentation that matters. As set forth in *Wands*, "a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed." To determine whether a particular nucleic acid is a vacuolar Na^+/H^+ transporter protein and would work as expected in methods of the invention, one of skill need merely test the protein for Na^+/H^+ transporter activity using various methods known in the art, such as *in vitro* testing or actual expression in plants and testing for salt accumulation in plant parts using the methods described in the specification. See, e.g., Example 1 and 2. Thus, while one of skill would need to perform a certain amount of experimentation in order to identify plants useful in methods of this invention, this experimentation is merely routine and well-described in the specification.

As such, the specification as filed teaches one of skill how to make and use the presently claimed invention. Applicants thus respectfully request withdrawal of the enablement rejection.

VI. Rejection under 35 U.S.C. § 112, second paragraph, indefiniteness

The Office Action has rejected claims 1-22 as being indefinite. Applicants have amended claims 21 and 22 and cancelled claims 1-20. Since these amendments render the rejection moot, Applicants respectfully request that the rejection be withdrawn.

VII. Rejection under 35 U.S.C § 102(e)

Claims 1-9, 11-12 and 20-21 have been rejected under 35 U.S.C. §102(e) as being anticipated by Gaxiola (US2002/0023282, filed August 2000). In making this rejection, the Office Action characterizes Gaxiola as teaching "Arabidopsis whole plants transformed with a construct comprising the 35S promoter operably linked to a nucleic acid encoding a H^+ pyrophosphorylase" (Office Action, page 8) as well as growing and harvesting these plants from salty soil.

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To the extent the rejection applies to the amended claims, Applicants respectfully traverse the rejection and its supporting remarks. Anticipation requires that a single reference disclose each and every element of the claimed invention. The presently claimed invention is directed to methods for lowering the salt content of soil by cultivating a transgenic plant comprising a recombinant nucleic acid encoding a vacuolar Na^+/H^+ transporter. Gaxiola fails to disclose a nucleic acid encoding a vacuolar Na^+/H^+ transporter and therefore fails to anticipate the presently pending claims. Furthermore, even if Gaxiola did disclose each and every element of the claimed invention (which is denied), the reference could not anticipate the claims since it was filed after the priority date of the instant application. As discussed in the section entitled "Effective Priority Date," the presently pending claims have a priority date of March 18, 1999, while Gaxiola was filed August 2000. Therefore, withdrawal of the rejection is respectfully requested.

VIII. Rejection under 35 U.S.C § 103/§ 102

Claims 1-9, 11-12 and 14-17 have been rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Young et al. (WO91/06641). With this amendment, claims 1-9, 11-12 and 14-17 have been canceled. Since the rejection is now moot, Applicants respectfully request withdrawal of the rejection.

Dependent claim 22 is rejected under 35 U.S.C. 102(c) as anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Gaxiola (US2002/0023282, filed August 2000). Applicants respectfully traverse the rejection and its supporting remarks. As discussed in the above rebuttal of the rejection under 35 U.S.C. §102(e), Gaxiola fails to anticipate claim 21. As such, Gaxiola cannot anticipate claim 22, which is dependent on claim 21. The Examiner has also failed to establish a *prima facie* case for obviousness, as the Office Action fails to cite a reference that remedies the deficiency of Gaxiola. Finally, as discussed above, the effective filing date of this application precedes Gaxiola's filing date, thus rendering the rejection moot. Withdrawal of the rejection is therefore respectfully requested.

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IX. Rejection under 35 U.S.C. § 103

Claims 18-19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Young et al. (WO91/06651). Since claims 18-19 have been canceled, the rejection is now moot. Withdrawal of the rejection is respectfully requested.

X. Nonstatutory, Obviousness-Type Double Patenting

Claims 1-20 have been rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 3 and 5-34 of U.S. Pat. No. 6,936,750 and claims 1-20 of U.S. Pat. No. 7,041,875. Claims 1-20 have also been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-21 of copending app. No. 10/617,623; claims 1, 9-11, and 18-21 of copending App. No. 10/617,624; claims 17 and 19-48 of copending App. No. 11/067,456; claims 17 and 19-48 of copending App. No. 11/067,558; claim 17 and 19-48 of copending App. No. 11/065,977; and claims 1-13 and 19-20 of copending App. No. 10/520,497. Since claims 1-20 have been canceled, the rejection is now moot. Withdrawal of the rejection is respectfully requested.

XL Conclusion

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

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In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 595792000121. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

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